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LIFECRAFT: AN ANDROID BASED APPLICATION SYSTEM FOR WOMEN SAFETY

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***Abstract*— Women have ensured the stability, progress and long-term development of the nations throughout the history. If women are subjected to violence and harassment, they cannot be genuinely included in society. With increasing heinous incidents involving women and children, an advanced system is needed to serve the purpose of getting help as soon as possible. At present time, the use of smartphones has increased rapidly, making it possible to use a smartphone efficiently for security or other protective purposes. All the recent atrocious incidents have made us think about to go for the safety issues. The crimes against women can be minimized with the help of our application "LifeCraft". It is an application for android for women's safety though men can also use it at a distress situation. It can be activated by voice command or SOS key. An alert message with location is sent to the user defined numbers in every five minutes until the system is turned off [1]. Many cases remain mysterious due to insufficient evidence. So, we have kept audio recording option to keep evidence. Continuous location tracking, showing the victim safe zone, offline mode is some of the most useful features of this system.**

Keywords—women security, android application, voice command, location tracking, offline, safe zone

I. INTRODUCTION

While the government has taken many steps, the crime rate against women is not minimizing [3]. It is growing daily at a shocking rate. Eve teasing, harassment, molestation, rape, domestic violence, abduction is becoming a part of everyday life. Many women safety applications have been made to handle this emergency situation [1]. Here we are introducing an android app that ensures women's safety and minimizes the danger by identifying the position of the person at risk.

The main functionality of the app is, at first user has to make sure that the app is on when she steps out. Whenever any unfortunate event occurs, she has to press SOS or can scream to give the voice command for starting the main function of the app. After starting the main function, it will send emergency message with victim's current location to the registered contacts. And also, it will make a call to the helpline number. At the same time, it will start audio recording. The app can do live streaming so that the registered contacts can see the victim's current location time to time. We have also kept offline system. After the work is done with the app, user has to turn it off to stop its functionality.

Industry 4.0 and the Internet of Things (IoT) are two of the hottest mottoes in real-world technology. Industry 4.0 seeks to promote human-to-technology communication. It aims at more advanced world as well as more secured and easier system for everyday life, and our work serves that purpose successfully. Our work is related to intelligent computing and security system, we hope that it will make some contribution to it.

The rest of the paper is as follows organized. Section II presents the related work. In Section III, the proposed methodology of the system is introduced and the system design is presented by diagrams. Section IV provides briefly the results and uniqueness of our system. Finally, Section V presents a comparison table with some existing systems and section VI presents this paper's conclusion and future work.

II. RELATED WORK

It is a very unfortunate observation that there has been a shocking increase in crimes against women [4]. 731 rapes reported in first six months of 2019 in Bangladesh which shows how important it is to do something immediately to decrease it. We have gained knowledge regarding this purpose and studied many papers which are related to this project.

There is an app called "Raksha-women safety alert". This Raksha app has made for women safety so that a woman will always feel safe. It sends alert messages with location to the specified contacts [5].

Here is another app named "I Go Safely" [6]. This application sends a 30 seconds audio recording and video clip to the registered contacts along with emergency message. The app is activated if the user shakes the phone or will drop the phone. But If anyone shakes the phone mistakenly it will start working which can make unnecessary problems. Similar to this there is another app named "Shake to Alert" [7].

Another example of an application named "Safety pin". The application has some features like emergency contact numbers, GPS Tracking. At the time of danger, the app pins the safe areas along with their security scores to go. It allows users to identify areas that are potentially unsafe to help others [3].

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"Abhaya" is another android application for the safety of women. It identifies the location of the site via GPS and sends a message to the registered contacts that includes this location URL and also calls on the first registered contact to assist the one in dangerous situations. This application's unique feature is to send the message continuously to the registered contacts for every five minutes until the "stop" button in the application is clicked. Continuous SMS location tracking helps to find the victim's location quickly and to rescue safely [9].

After studying some papers including the apps mentioned above, we got to the fact that, though there are various applications which serves the same purpose as ours, they lack some features. For example, some sends the location URL but cannot show safe places; some can do live streaming but cannot do any recording to keep evidence etc. These facts led to think about making a new application which has all those features altogether to guarantee a safer life.

III. PROPOSED SYSTEM

Our system is designed such a way that it will be unique from other existing app by integrating all the features offered by those. The user needs to initialize the application by registering. User can login with the registered email and password. User has to put three contact numbers manually. They will be registered with the Firebase Database.

Every time the user uses this application, she needs to start the app by turning on the On/Off button. Then the app will start working until the user turns it off. Whenever the user presses the SOS key or screams with the voice command the app will start its emergency service and will send alert message containing the user's name with the location to the registered contacts. The location will be sent in every 5 minutes to the contacts so that if the person changes his/her place, they can know about it and reaches out for help [1]. Also there is a system of live streaming. When the user travels from one place to another, the registered contacts can watch his/her positions using Geofire.

There is a system of audio recording. After getting the SOS command the system will start recording the surrounding for the first 5 minutes so that the user can use it later as a proof. By safe zone option user can see nearer police stations through map. Besides the emergency contacts, there is another option called emergency number which is country's helpline number. Whenever the application gets SOS command, it will make a call to that number which is toll free. The user needs to put that helpline number manually as we are planning this application for worldwide use.

Sometimes user may run out of money and cannot use data to use all the features in a distress situation. Keeping that in mind we have planned for Offline mode where the application can send alert message but without location, can make call to the helpline number and do audio recording. This feature has been added for minimizing danger anyhow so that in any situation the user can get help. Though the application cannot send location with this feature but user's family may know the route of her and can reach out for help or can at least know that she is in danger.

We have used android studio 3.3.2 and java jdk 11.0 to build our app "LifeCraft". To use all the features, the app does not require any external hardware. And it can be used with any GPS enabled android phones.

A use case model and a flowchart diagram of the proposed system is given below which will make it easy to understand all the working methodology of our system.

A. Use-Case Model of the Proposed System

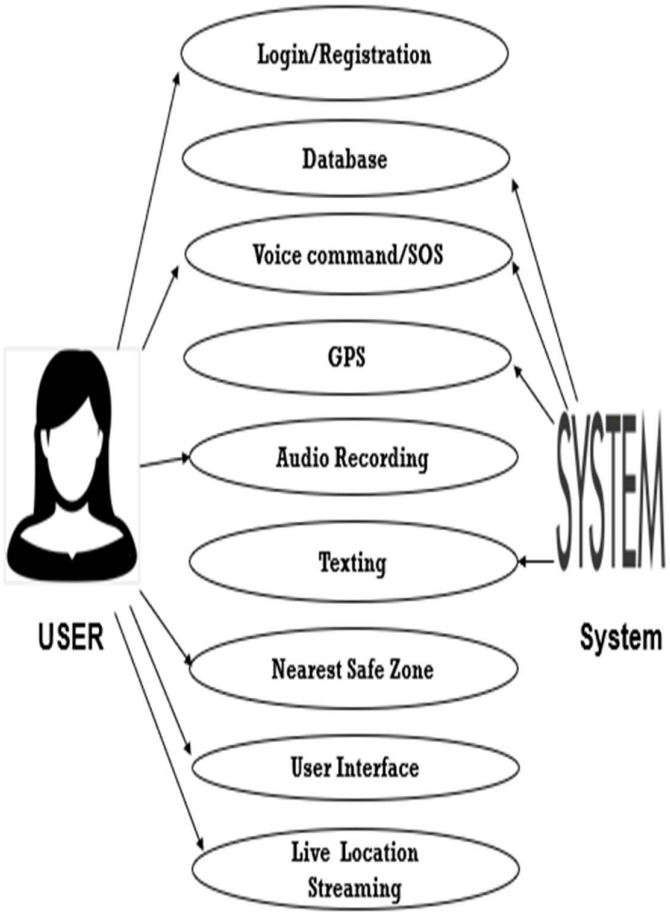

Fig 1: Use-Case Model

Figure 1 represents the use case model of our system "LifeCraft" where the user has access to Login / Registration page, previously saved audio recording files, user interface, map and can give voice command/ SOS. The system can use the database, GPS, recordings, can send texts and can take voice command/SOS command.

B. System Flowchart

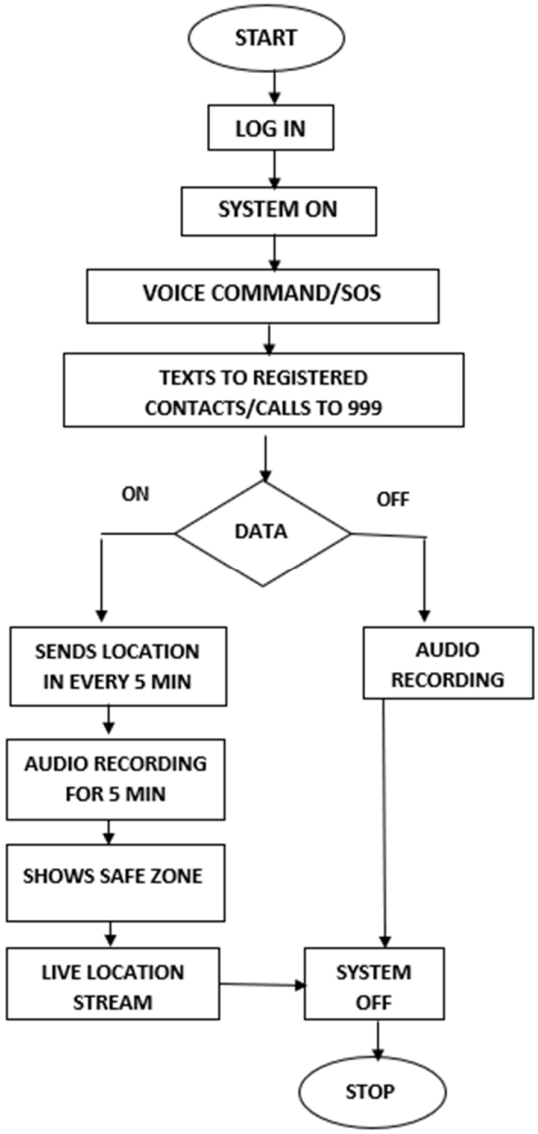

Fig 2: Flow-Chart of the proposed system

Figure 2 represents the system flow chart. After login, the system needs to be turned on, then it will start working in the background. After getting the command the system will start working following the previously discussed methods.

IV. Result & Uniqueness

Our application is very helpful in emergency situation and also unique from other applications.

A. Uniqueness

We have mentioned many android applications in the related work part having similar functions to our application. But in our application, we have some unique features which makes it different from other existing systems. They are:

- Safe Zone: Though there is another app which shows the safe zone to the victim but the working process is not similar. To show the safe places other app needs to use the same app user who will mark himself/herself as a safe place and victim will find them. But if there is no one to mark themselves at the emergency moment then the victim will not get this option. Also, it is mandatory to be a user of the app to mark thyself as safe zone. But in our system, we have marked the police stations as safe zone. Therefore, it will be easier and reliable for the victim to get the place which will be shown in the maps.
- Offline mode: By using our application, the user can be saved from danger even when the mobile network is switched off. In offline mode, an emergency message will be sent to the registered contacts but without sharing location and can call to helpline. We have kept this option so that at least the family would know about her situation and can take necessary steps as soon as possible rather than not knowing it all. Also, in offline mode, our app can do audio recording which is not available in another application "Raksha", which has the same feature.
- An advanced system: Our system is unique from others because not only it is implemented with two unique features but also, it is an integrated version. We tried to combine all the possible features to make it useful at any situation. Whereas other apps have only some of them.

B. Result

Here are some screenshots of the design of our proposed system by which our system can be more understandable.

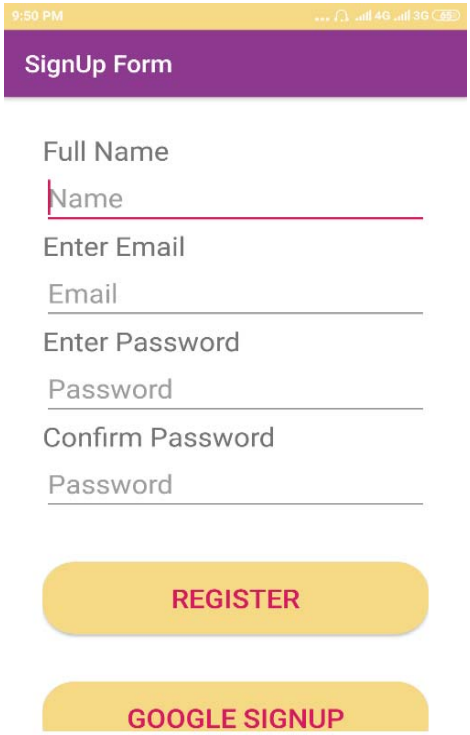

Fig 3: Sign Up Form

Figure 3 represents the signup form of the application. After filling it, user details will be saved into the database. User can also register through any google account.

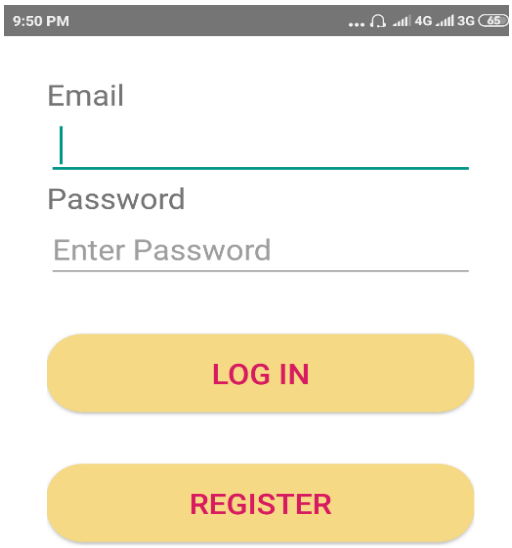

Fig 4: Login Page

Figure 4 depicts the screen shot of Login Page.

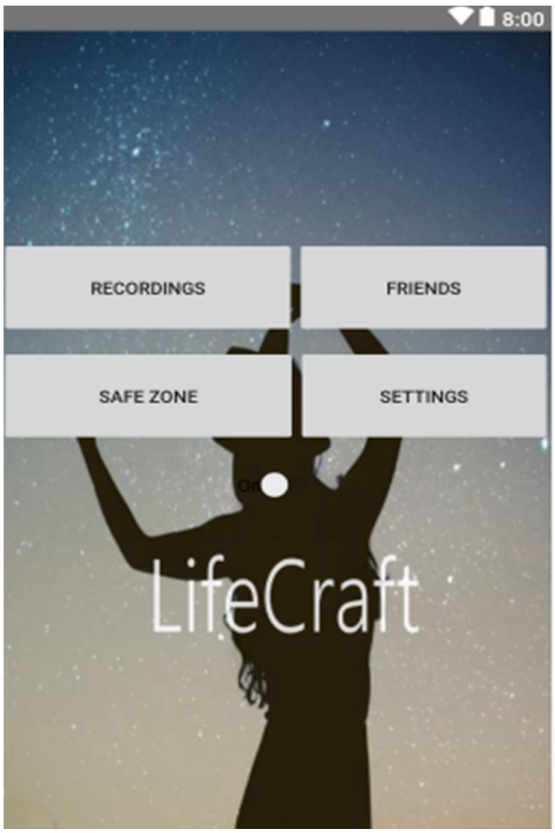

Fig 5: Screen shot of UI

Figure 5 represents the screenshot of its easy user interface. Here are 'Recordings' where we will get the audio recordings, in the field of 'Friends' we can see the live GPS stream of that friend, in the 'Safe Zone' section the user can see nearest police stations. And the 'On/Off' switch is to turn on/off the app.

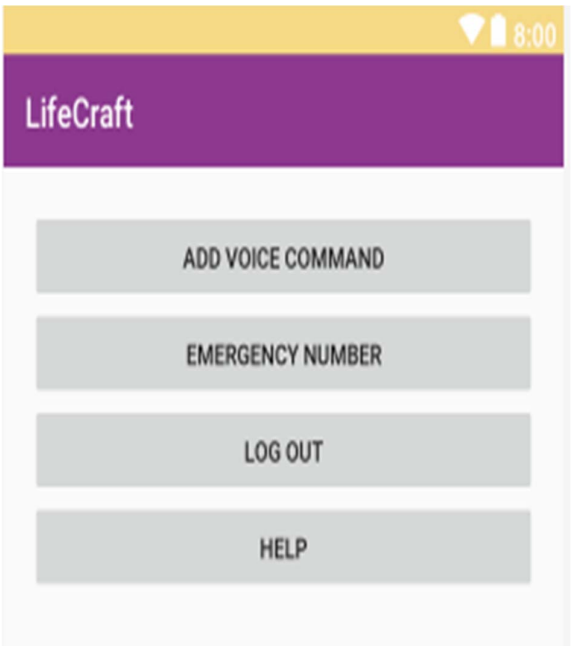

Fig 6: App Settings

Figure 6 displays the Settings of "LifeCraft" application. Here the user can add any voice command that he/she will use later in danger.

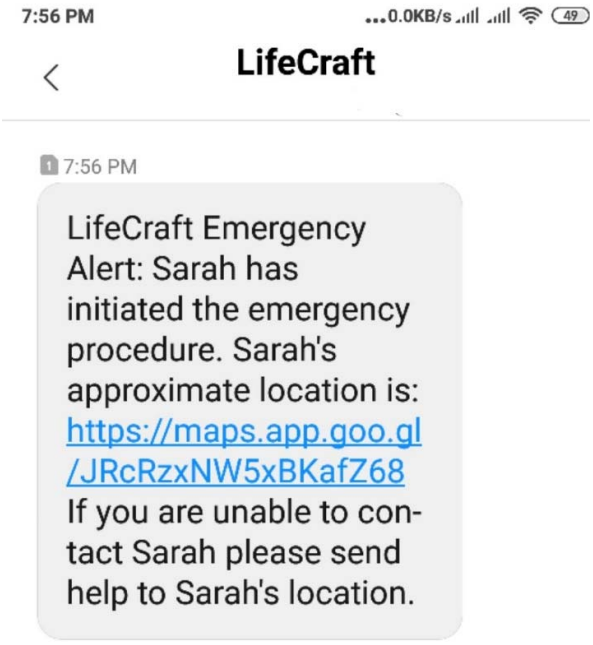

Fig 7: Alert Message

Figure 7 shows the alert message with location URL.

Fig 8: Google Map

Figure 8 shows the location of the victim. Also, safe zone and live streaming will be shown like this.

The application's key benefit is it is integrated with every possible feature to help someone in need. Voice command will help when the person cannot even reach to the phone. Offline mode will help by sending message and call and recording the surroundings even when the data connection is not available. Safe zone will help to find nearest police station. So, by combining all the helpful features, our application will overcome the lacking of other related existing systems.

V. Comparison with Existing System

In this portion, we are representing the main differences between the related existing systems and our proposed system "LifeCraft" in Table I by which we can show up the reliability and uniqueness of our work [3,5,6,7,9].

TABLE I
COMPARISON BETWEEN EXISTING SYSTEMS AND OUR PROPOSED SYSTEM

Features	**Raksha**	**I Go Safely**	**Shake to Safety**	**Safety pin**	**Abhaya**	**Proposed system**
Alert message	Yes	Yes	Yes	Yes	Yes	Yes
Send location	Yes	Yes	No	Yes	Yes	Yes
Live GPS tracking	No	No	No	Yes	Yes	Yes
Safe Zone	No	No	No	**Yes (Not always available)**	No	**Yes (Always available)**
Audio recording	No	Yes	No	No	No	Yes
Offline mode	**Yes (No recording)**	No	No	No	No	**Yes (with recording)**
Voice command	No	No	No	No	No	Yes
Has all these features?	No	No	No	No	No	**Yes**

VI. Conclusion & Future Work

This paper proposes a new women's safety model that aims to provide a very safe environment. Many unfortunate incidents took place in the case of women. Problems can come from anywhere. This paper analyzes the key needs of the intelligent security system with technology demand and system building challenges. Since the prediction of such incident is not possible hence to minimize it our proposed mobile application will be very helpful. It will not only help the women but also the children as it can work with voice command which is easy for a child to operate. And men can also use it when they face any big trouble and need help. Not only in sexual related problem, it can be used when someone faces accident or hijacking or public attack. Whenever anyone is in any kind of danger, our system will help to decrease the risk and make the world a better and safer place.

In future we will work on making it more secure so that we can decrease the crimes at the lowest level possible. We are planning to implement two unique features in this application which are new in safety app. That is hidden camera and microphone detection. As this is also a safety issue for women. User can check whether there is a camera or microphone hidden in the place. There are two ways to find a hidden camera using our mobile app. One is to look for the magnetic activity and another is to detect the non-visible white light. We will use the magnetic sensor of the smart phone's hardware (magnetometer) and infrared sensor (IR) in the camera to detect hidden camera. User can move his/her phone around suspected area, if a strong field is detected, user can be sure about hidden device that is secreted within the wall or object. Another way is by detecting light reflecting from a lens which can be caught by the phone's camera.

Another feature we want to implement in future is marking the risky places. If any user faces any bad situation at any place, they can mark that place as danger zone. Then another user can be informed about it by our system if they go near to that zone. We hope, these features will make it more useful and reliable.

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